NEWA (Network for Environment and Weather Applications) 2008: A Year in Review

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Abstract: NEWA operated and maintained the electronic weather network in 2008 with funding support from the NYS IPM Program. Visits or "hits" to NEWA's website were comparable to last year. Rainwise MKIII instruments continue to be added to the NEWA system. Five grant projects are underway on a potato late blight simulation model, an apple IPM website, upgrades to grape models, and improvements to the NEWA website. Meetings were held in Western and Eastern NY to review the web site with growers, consultants and Extension educators so they could provide feedback on the current site. Plans are underway with Spider ITX to redesign the website. The Northeast Regional Climate Center (NRCC) began running the pest forecast models and providing the NEWA hourly data, daily weather summaries, and degree days from the newly finished database of NEWA data in their ACIS system.

Objectives:

1) Operate and maintain the NEWA electronic weather network.
2) Track and promote NEWA usage.
3) Update the NEWA website and pest forecast models.
4) Collaborate with the Northeast Regional Climate Center.

Procedures, Results, and Discussion:

1. OPERATE AND MAINTAIN THE NEWA ELECTRONIC WEATHER NETWORK.

During 2008, NEWA successfully maintained and operated a network of 48 weather stations collecting and delivering data to server sites in Geneva and Canandaigua. The addition of airport weather data was achieved through collaboration with NRCC. Most NEWA weather stations provided data year-round. Winter data was used for Stewart's wilt forecasts on sweet corn and to track low temperature in vineyards and orchards. Other models planned to use winter data include tracking chilling hours and critical temperatures.

The year 2008 featured some warm and dry conditions in April. It cooled down after that and remained on the dry side. The heat returned in June. In July and August it became rather wet and cool. There were frequent rains and severe weather, especially hail storms.

NEWA personnel made over 116 visits for maintenance, troubleshooting, and repair in 2008. Thunderstorm activity was higher than usual and caused problems with weather equipment. Lightning damaged the Scriba, Ransomville and Wayland loggers. Other damage occurred to modems attached to the weather equipment.

In 2007, TenEyck developed a NEWA Info database containing contacts and descriptions of each weather station in the network. This database has been maintained in 2008 and was shared with NRCC to provide them with a ready source for NEWA metadata.

RainWise Inc. MKIII weather stations. Six Rainwise MKIII instruments have been added to the NEWA network in 2008, at Fredonia, Lafayette, Appleton, Ransomville, and Red Hook. About the Rainwise MKIII, one grower said, "That is a really excellent weather station. I really love it."

An IPM-owned logger was added in January at the Cornell Lake Erie Vineyard Laboratory in Fredonia. It will be relocated to Portland, NY when the laboratory moves to its new location. A grower in Lafayette, NY purchased a Rainwise instrument and set it up in May, adding it to the network.

In April, a grower in Appleton, NY replaced his lightning-damaged Sensatronics Field Monitor with a Rainwise MKIII and NEWA personnel assisted the grower in setting up the weather station. Another damaged IPM Sensatronics logger in Ransomville was swapped out in November for a Rainwise MKIII. The grower now FTP's weather data to the NEWA server. The old unit will hopefully be able to be repaired and redeployed at a later date.

A grower in Red Hook, NY, because of the difficult nature of the Rainwise industrial unit he had, swapped it for a Rainwise MKIII from the IPM program. This was done in November with the help of Mike Fargione, Hudson Valley Cornell Cooperative Extension Fruit Program. The industrial logger will be retrofitted by Rainwise and redeployed in Western NY at a later date. This swap also allowed the grower to send the weather data via FTP rather than a modem connection.

Data transmission to NEWA. One problem the wireless weather stations posed to the network was when the loggers failed to receive data from the weather station zero's would appear in the data stream and go into the database. Programmers at NRCC advised tagging missing data as -99 so it could be identified and corrected in the database. Wayne Burnett of Rainwise has revised their FTP program to mark zero entries as -99. This new program is currently being field-tested and de-bugged. As soon as testing is complete a new FTP program will be sent to all Rainwise loggers.

A second data transmission problem was identified and resolved in 2008; the radio communication board malfunctioned in cold weather (below 25F). This was isolated by Rainwise personnel and a new board made. Most radio communications boards were replaced in 2008 and the remainder will be in early 2009.

Rainwise and NEWA are exploring new ways for the Rainwise weather stations to send data back to the NEWA server. One idea is to embed a web server in the logger portion of the weather station. The server would send data at a predetermined interval back to the NEWA sever. This would only require an internet connection. A second idea is to send the data through a cellular IP protocol. A cellular modem capable of obtaining an IP address would send data to the NEWA server. This cellular modem would cost about $300, be self-contained in the weather instrument, and would replace the grower's computer as the link for sending data.

2) TRACKING AND PROMOTING NEWA USAGE

In 2008, the NEWA website no longer required a username and password. As a result, accurate statistics on new users is not available this year. This change occurred in April. During the first three months of 2008, 59 new users had registered on NEWA. Since open NEWA access,

website hits from robots and web crawlers is immense, inflating the number of hits 15-fold and making the calculation of actual hits from users difficult. We have funding to develop a new website in 2009 with Spider ITX and will deploy user registration and web statistics to allow us to more accurately track NEWA user information and web page useage. The NEWA web pages are served from NRCC and NEWA servers and we have compiled the web hits for 2008 from these sources (Table 2 and Fig 1).

Table 1. NEWA web hits for the last five years. No data is available for January 2005 (na).

Month	2004	2005	2006	2007	2008
January	6260	na	9083	9548	5528
February	2986	11535	6182	7507	4056
March	2695	6697	8633	9776	5817
April	5902	8341	15305	9859	12774*
May	9969	14759	14084	12908	12695*
June	8810	11422	12848	13301	10003*
July	7590	10542	11434	13433	7937
August	6371	9899	10708	10262	5853
September	4627	8515	10044	17257	5157
October	3423	9028	9034	9334	8156
November	3296	9151	5649	8252	5906
December	4210	7438	6662	7244	5486
Total	**68143**	**107327**	**121672**	**130688**	**91376**

*does not include NRCC data

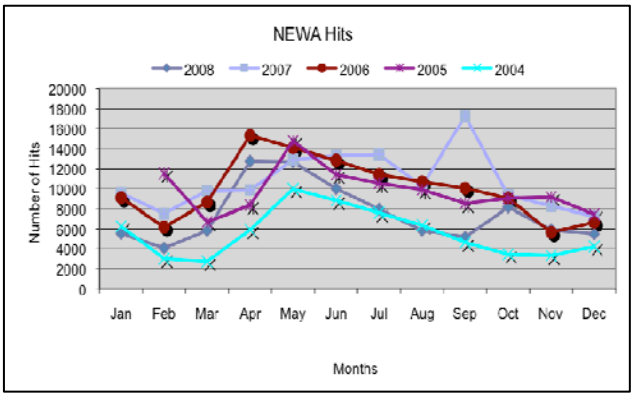

Figure 1. Number of web hits to the NEWA website for the years 2004 – 2008. Peak usage occurs in spring to summer.

This year to recognize our 50 NEWA cooperators and collaborators, we sent each thank you letter and a hat bearing the NYS IPM Program logo.

NEWA weather and pest forecast information is also distributed in extension newsletters and email alerts that reach many farms. At various meetings talks were given describing NEWA and the new RainWise weather instruments (Table 2).

Table 2. Presentations on NEWA given during 2008.

Date	Title	Location	Audience	#
Sep 9	NEWA – Network for Environment and Weather Applications	NWS, Binghamton, NY	NWS meteorologists	20
Nov 12	Web-based IPM Resources for Tree Fruit	Ithaca, NY	Educators and faculty	8
Nov 18	NEWA Website Review	Geneva, NY	Consultants, growers, educators	17
Nov 20	NEWA Website review	Ballston Spa, NY	Growers and educators	11

3) UPDATE THE NEWA WEBSITE AND PEST FORECAST MODELS

We began a risk management education project with a comprehensive review of the NEWA website by Cornell Cooperative Extension educators, growers, and consultants. Two sessions in November in western and eastern NY provided feedback on the NEWA website. Those results have been compiled and a meeting was conducted with Spider ITX to implement a plan to develop the new NEWA website. This new website should be available by March 2009.

William Fry has introduced a new late blight simulation model. Developed in 2008, it will be used experimentally by three growers in 2009. Two growers reviewed the model and commented on what they would need from the model. The model was also demonstrated at several meetings

in the summer and fall. The new model will not only provide blight information from the weather instruments but incorporate weather forecast data for future predictions.

Harvey Reissig has undertaken linking pesticide information with NEWA apple pest forecast models. A tree fruit IPM website is being developed to display NEWA models as well as comprehensive, pest-specific pesticide information from the Cornell Pest Management Guidelines for Commercial Tree Fruit Production. NEWA apple scab and fire blight pest forecast model pages have been upgraded and the apple insect degree day calculator is being re-designed with pest status and pest management messages.

Carroll and Weigle secured funding for revisions to the grape NEWA web pages. This project will improve disease model pages, provide research-mode insect phenology models, and develop viticulture tools including cold temperature alerts, vine phenology and harvest windows.

4) COLLABORATE WITH THE NORTHEAST REGIONAL CLIMATE CENTER.

The Northeast Regional Climate Center (NRCC) and NEWA continued to collaborate in 2008, recognizing the benefits of building a stronger weather information collective at Cornell University. NRCC continues to provide NEWA with links to the Stewart's wilt forecast maps, evapotranspiration (ET) maps, degree-day maps and NWS degree day forecasts. NRCC data is compiled from information provided by airport observations and the Cooperative Observer Network and they now have access to 48 additional sources of weather data from NEWA.

The weather data secured by NRCC from the NEWA server was archived and new data is now routinely being collected from NEWA and placed into the ACIS database. As of April 2008 the NEWA hourly data, daily weather summaries, degree days, and pest forecast models are now being displayed and run as on the NRCC servers. The NEWA server collects the data from the weather instruments and makes it available to the NRCC server.

NRCC completed and is now running programming that automatically corrects and patches missing weather data from nearest weather station locations. These "sister" weather stations are selected for proximity and sensor capability. This was implemented in the summer of 2008 and provides a continuous data stream which is critical in degree day accumulations and pest forecast models. The data is italicized in brown font so the user knows it comes from a sister station.

Programming is near completion for utilizing forecasted weather data in pest forecast models. This approach grew out of the potato late blight simulation model. This will allow pest forecast models to actually forecast potential insect and disease events based on forecasted data.

NEWA GRANTS - FUNDED

Carroll. 2008-2009. Applying weather data and forecasts for managing crop inputs and reducing crop losses. Northeast Center for Risk Management Education $49,973.

Carroll and Weigle. 2008-2010. Weather-driven grape IPM forecast models and decision aids from the Network for Environment and Weather Awareness. Smith-Lever $20,000.

Fry. 2007-2010. Improved late blight forecasting – the roles of weather, inoculum, host resistance, and fungicide. Hatch. $60,000.

Reissig. 2007-2008. Development of enhanced, web-based Cornell tree fruit pest management guidelines. NY Farm Viability Institute. $100,000.

Reissig, Agnello, Cox and Carroll. 2008-2009. Development of web-based New York tree fruit pest management guidelines. Smith-Lever. $75,000.